

A Situational Approach and Intelligent Tool for Collaborative Requirements Elicitation

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I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

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Signature of Candidate

A handwritten signature in dark ink, appearing to read 'Chad Coulin', is written over a horizontal line.

Chad Raymond COULIN

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ABSTRACT

Requirements elicitation is a fundamental part of the software development process, and widely regarded as one of its more challenging activities. Many of the current techniques, approaches, and tools are either unknown or too complex for novices, resulting in a significant gap between requirements elicitation theory and practice. Just as important, is the current gap between expert and novice analysts, which can be attributed to the extensive skill set and range of experiences that is often required to successfully conduct this difficult yet vital activity. Consequently, in this research we investigated both the state of the art and the state of practice, in order to develop and evaluate an approach and a tool to support novice analysts elicit requirements for software systems in a workshop environment.

The first stage of the research was a literature review, which involved a thorough review and critical analysis of existing theory on and around the area of requirements elicitation. This was followed by a survey of practice, which consisted of in-depth interviews with experts, and an online questionnaire for novices, used to elicit approach guidelines and tool features. The OUTSET approach was then designed, and the supporting tool MUSTER constructed. The final stage of the research involved the evaluation of the approach and tool through a case study, case study experiment, and formal experiment.

The empirical evaluations conducted showed that using the MUSTER tool improved the overall effectiveness of the requirements elicitation process, while the underlying OUTSET approach improved the overall efficiency. It was also shown that the combination of the approach and tool provided a collective system that was both useful and useable. In the experiment conducted, the MUSTER tool received more than three times the score of the manual tool for effectiveness, and more than double for usability. In addition, the combination of research methods used, and the successful application of Situational Method Engineering (SME) and Group Support System (GSS) principles for the approach and tool respectively, was both novel and unique from any other previous work on requirements elicitation.